

Table 1

<div> Upper <div> <div></div> <div></div> </div> Lower </div>	Network / Subnetwork	
	ATM	Virtual Path
		Virtual Channel
	SONET or SDH	Path (Path in SDH)
		Line (M-Section in SDH)
	OTN	Optical Channel
		Optical Multiple Section

00617837.071700

Figure 1

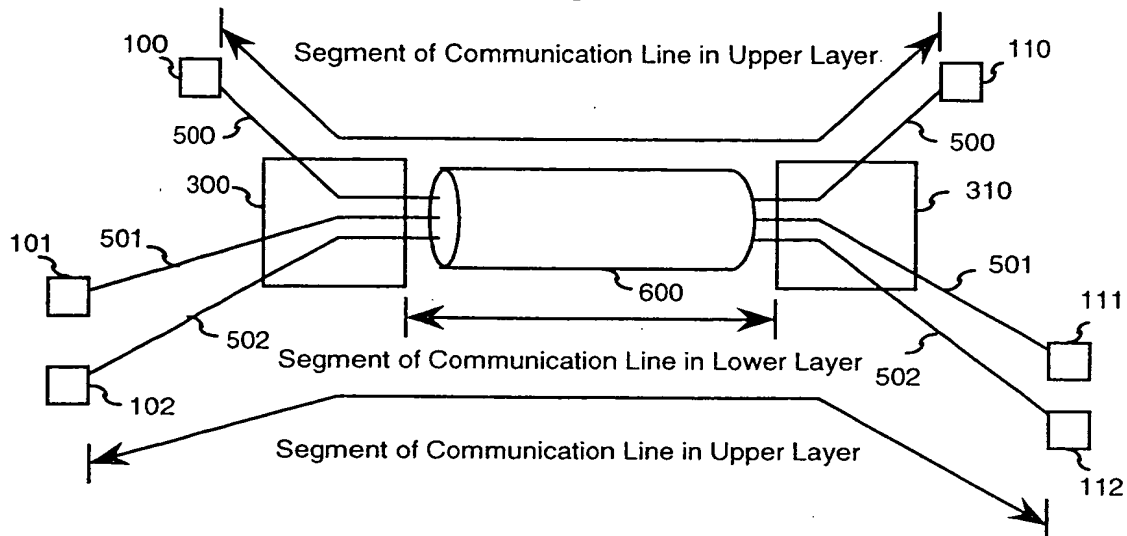


Figure 4

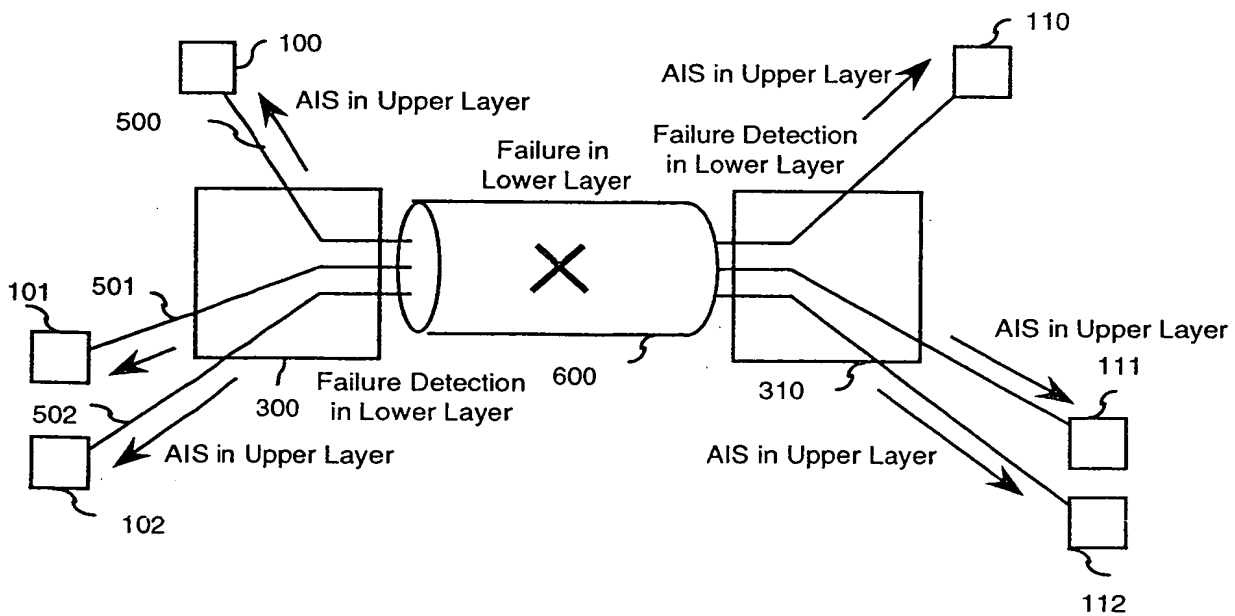


Figure 2

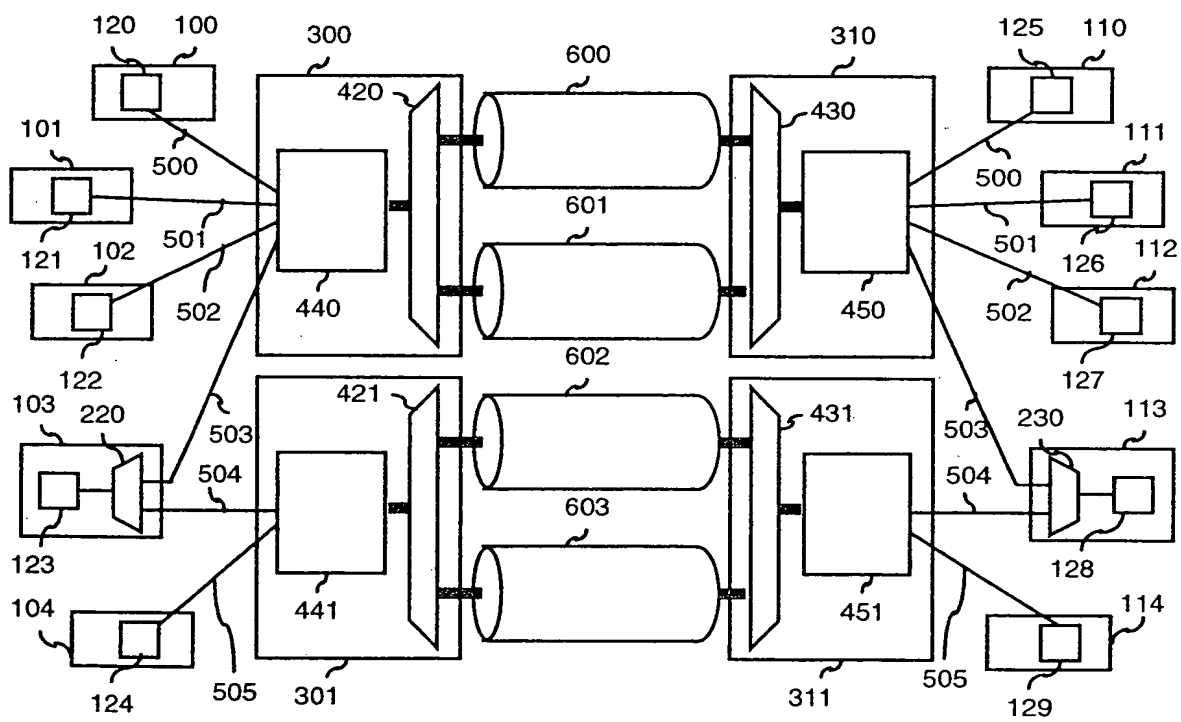


Figure 3

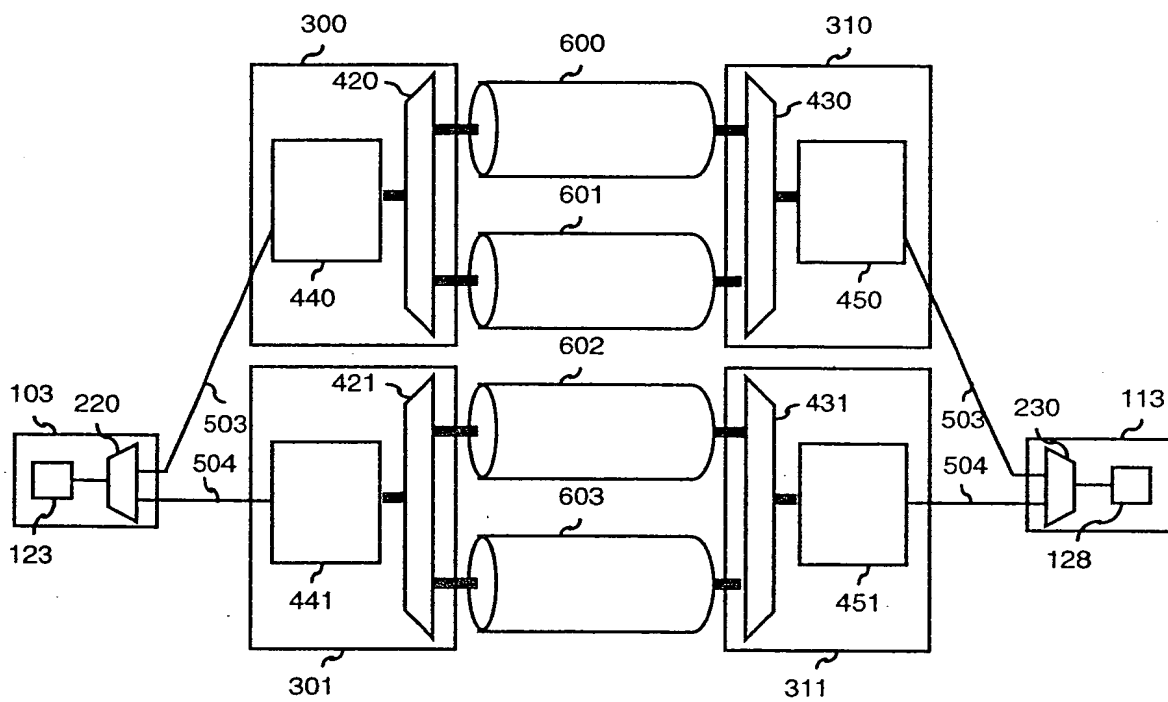


Figure 5

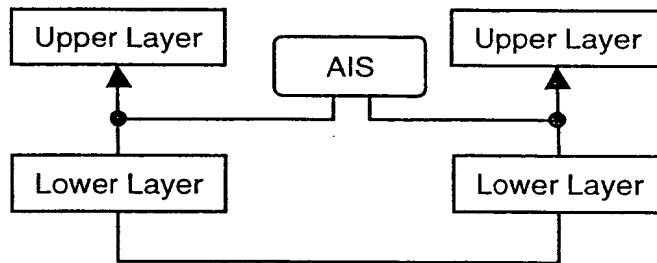


Figure 8

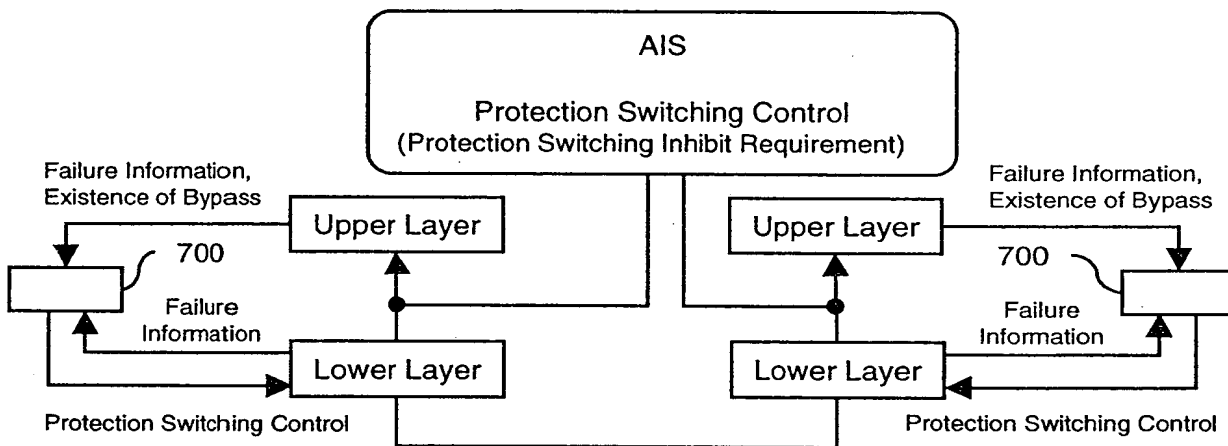


Figure 6

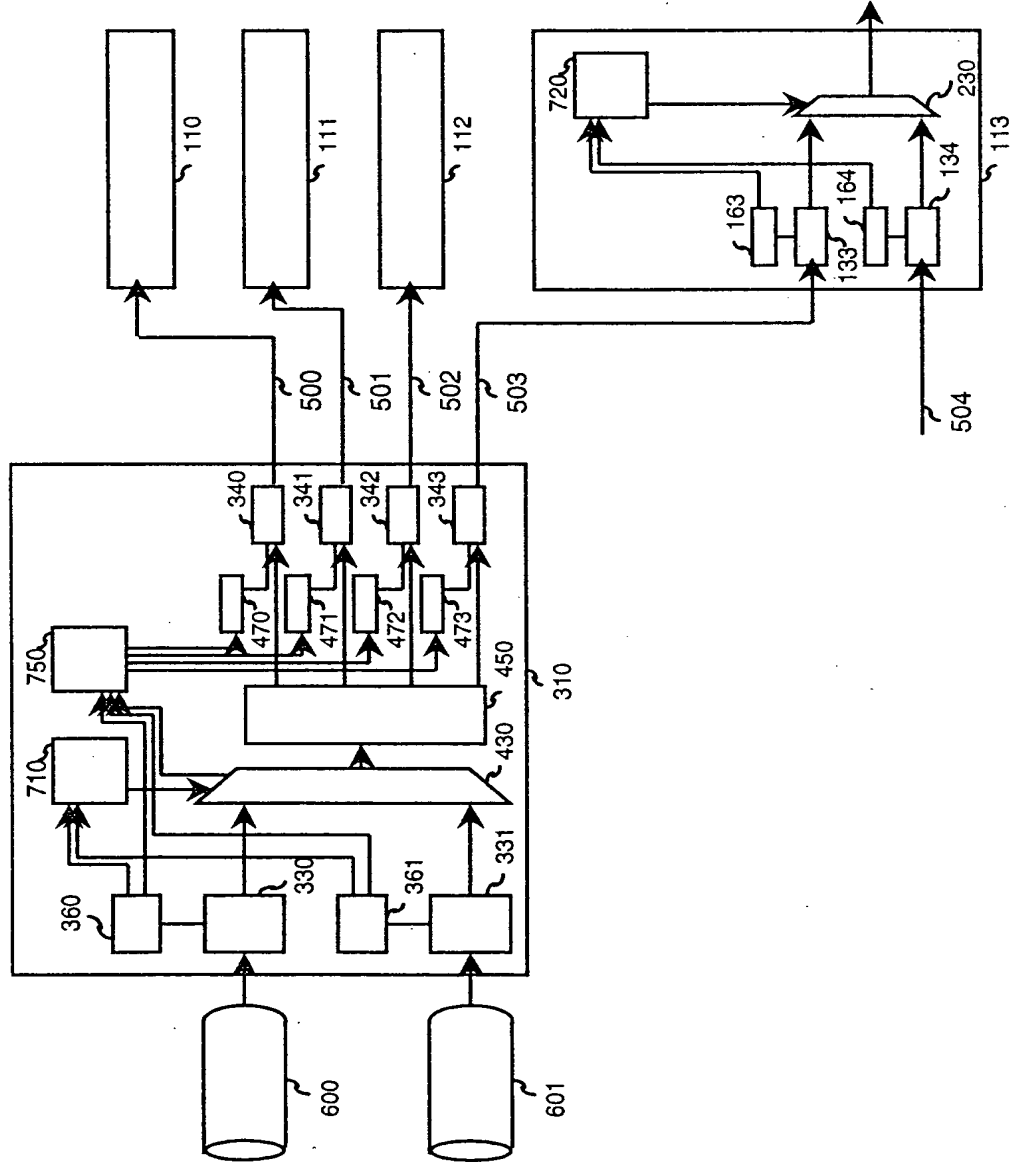


Figure 7

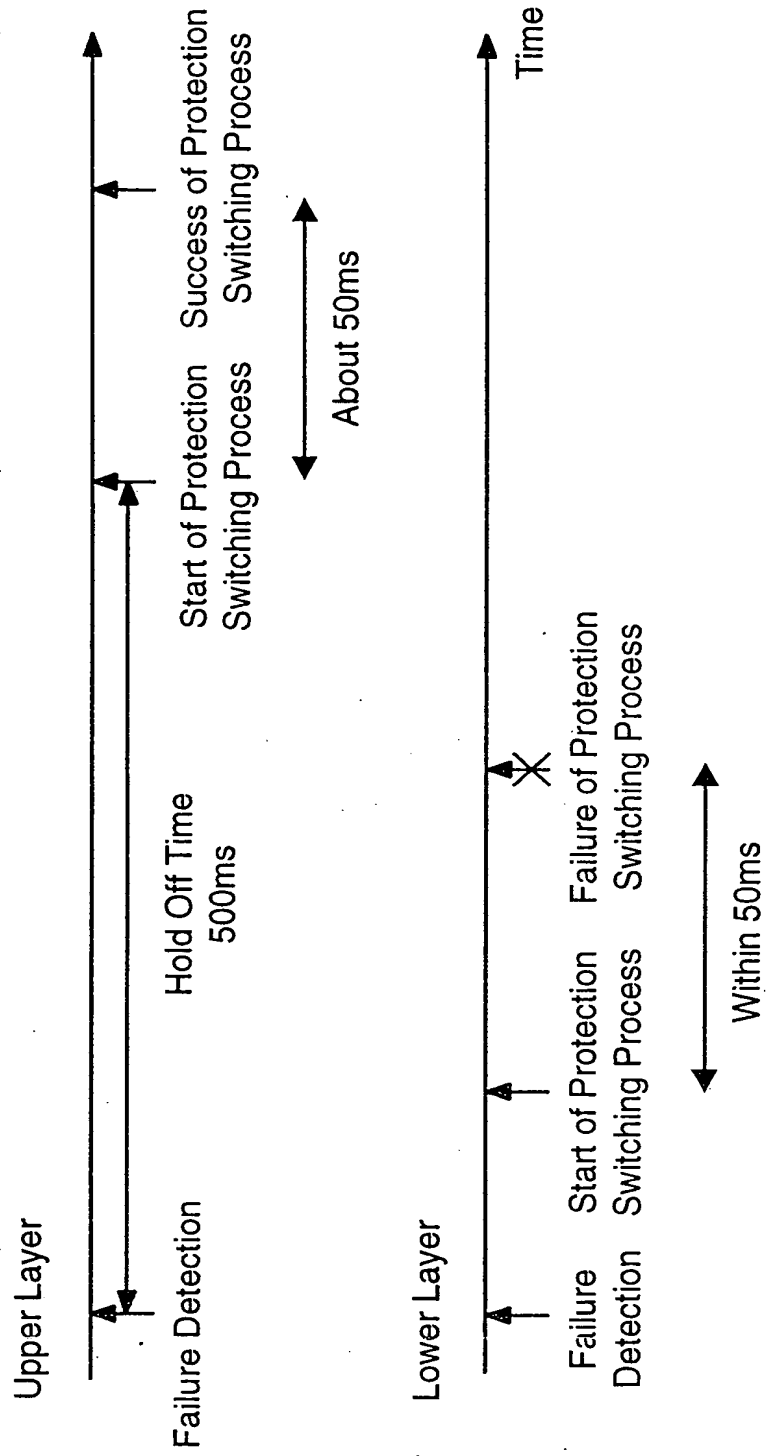


Figure 9

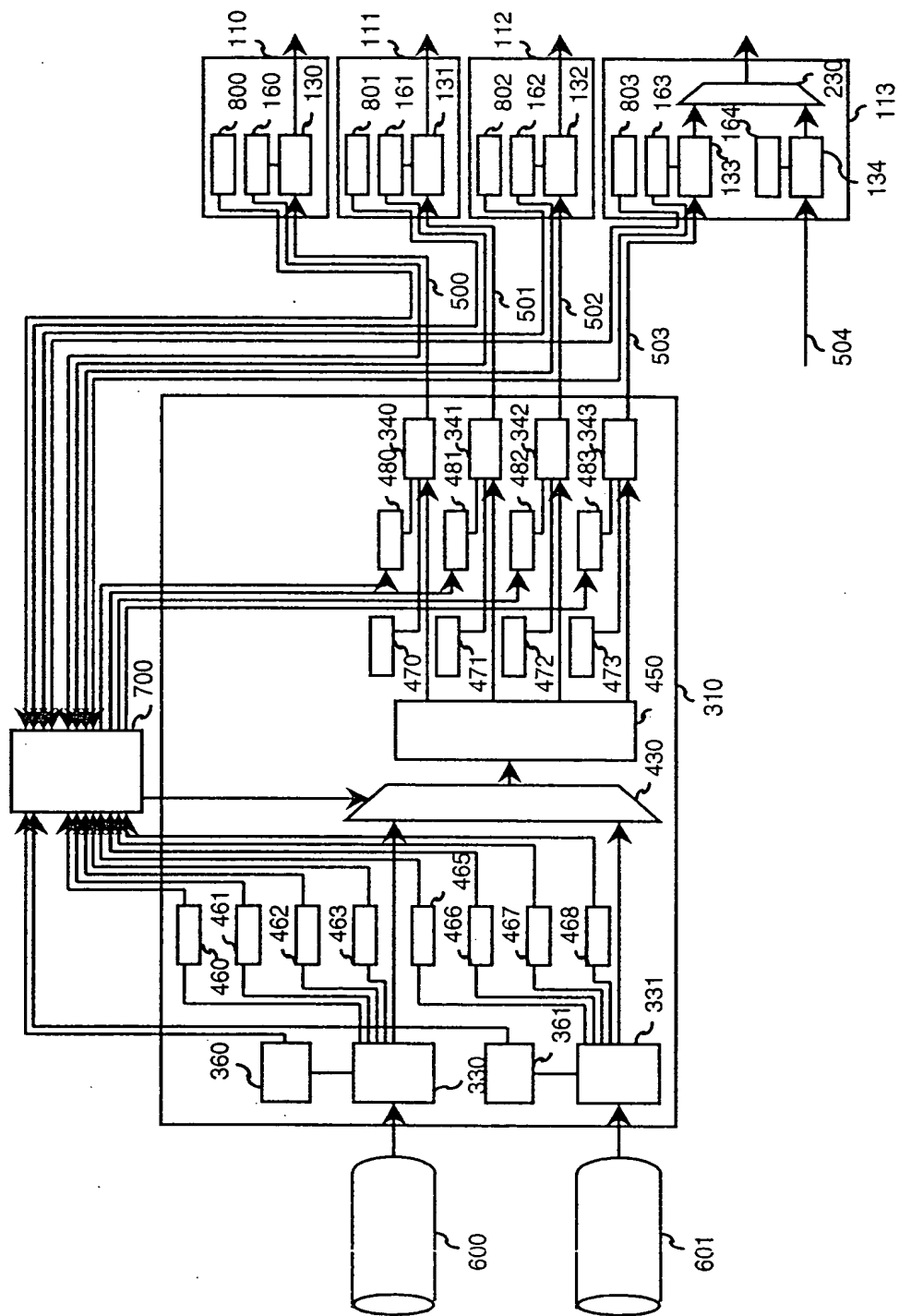


Figure 10

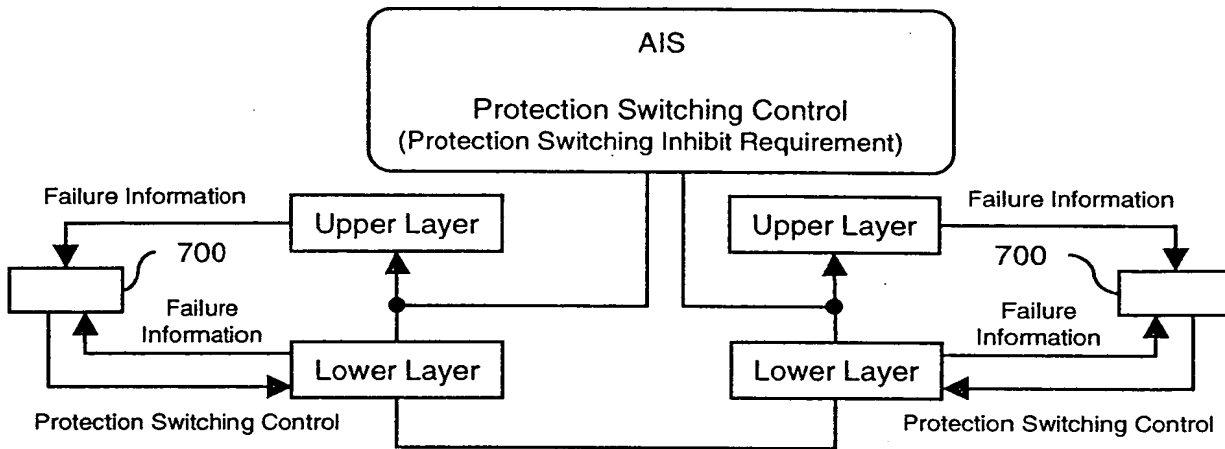


Figure 12

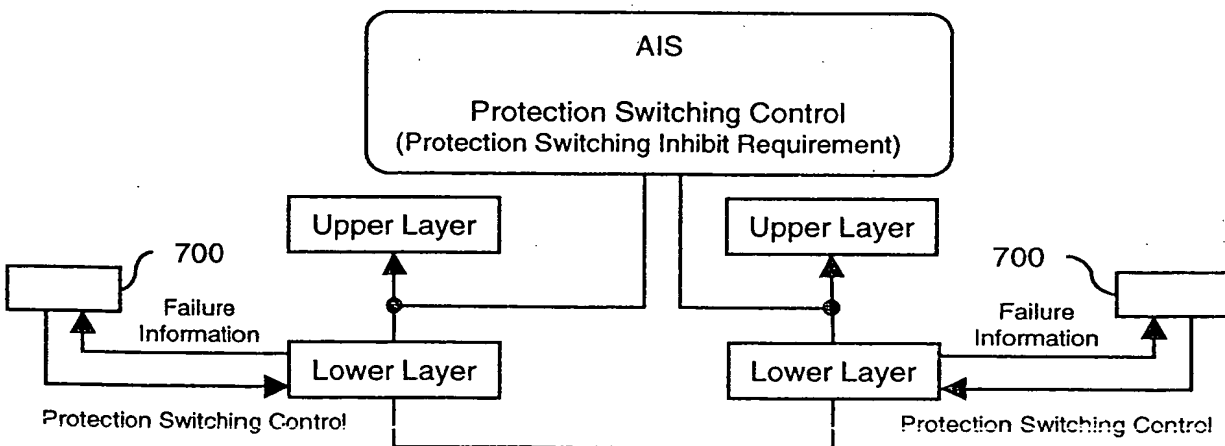
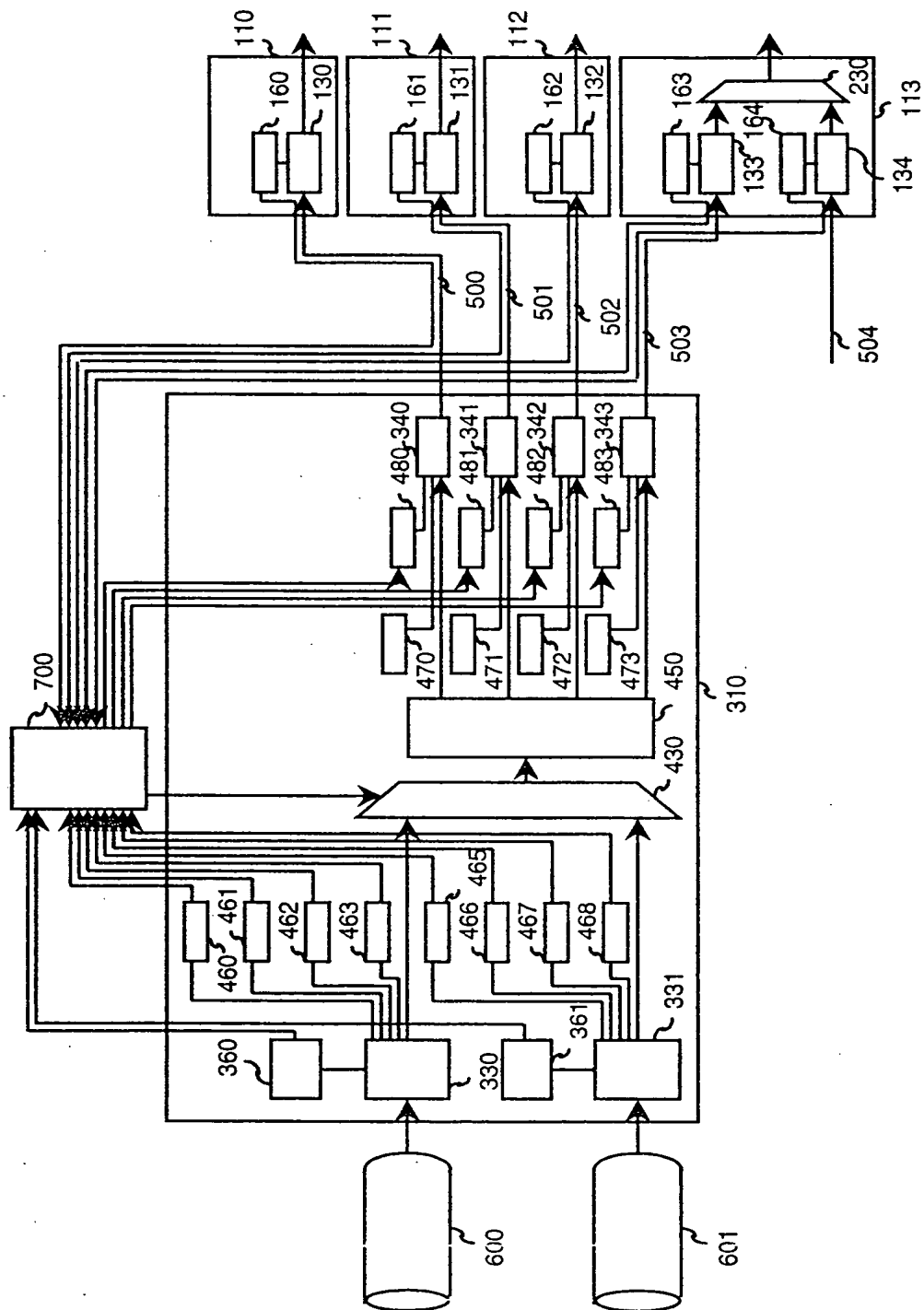


Figure 11



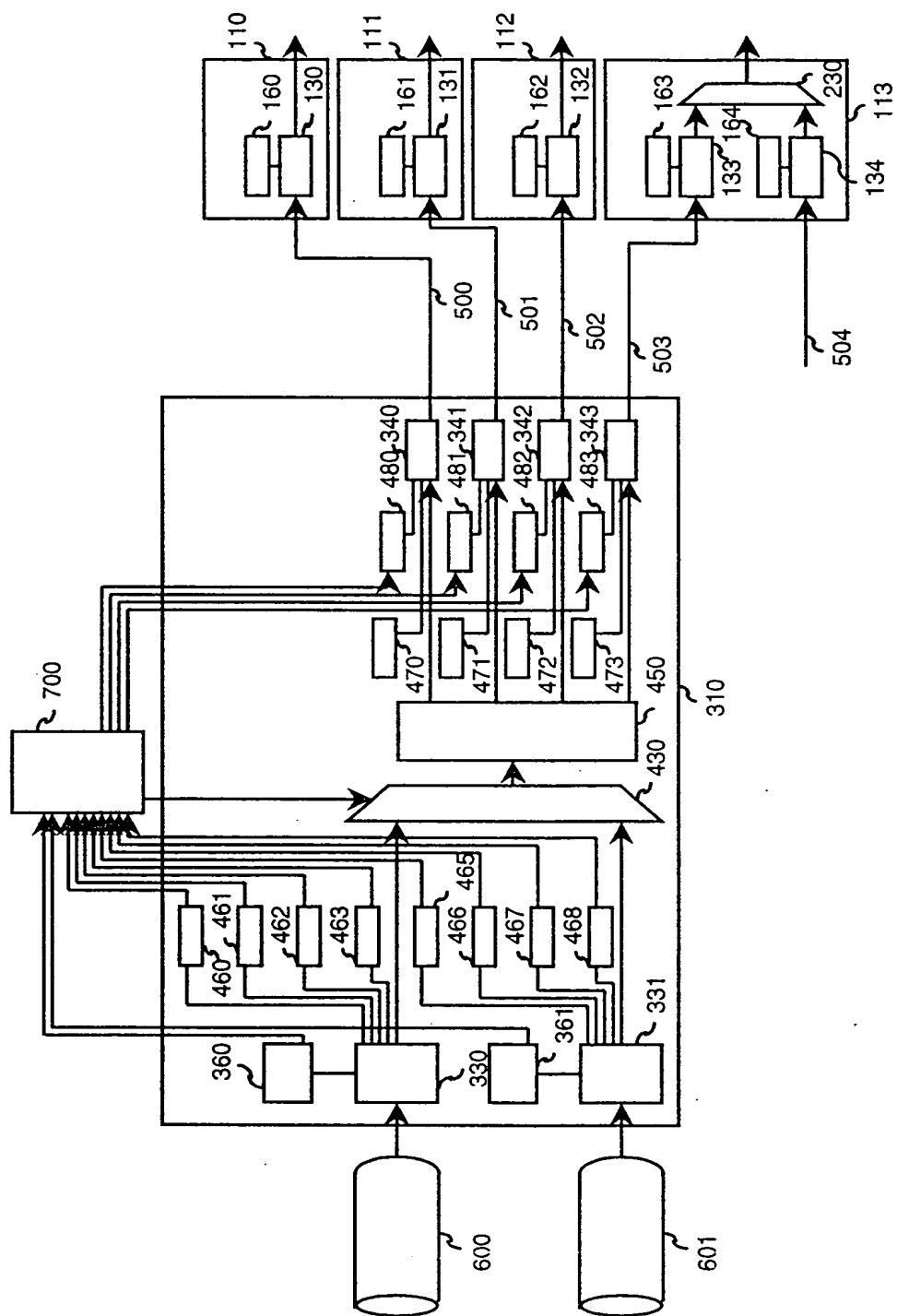


Figure 14

Figure 15

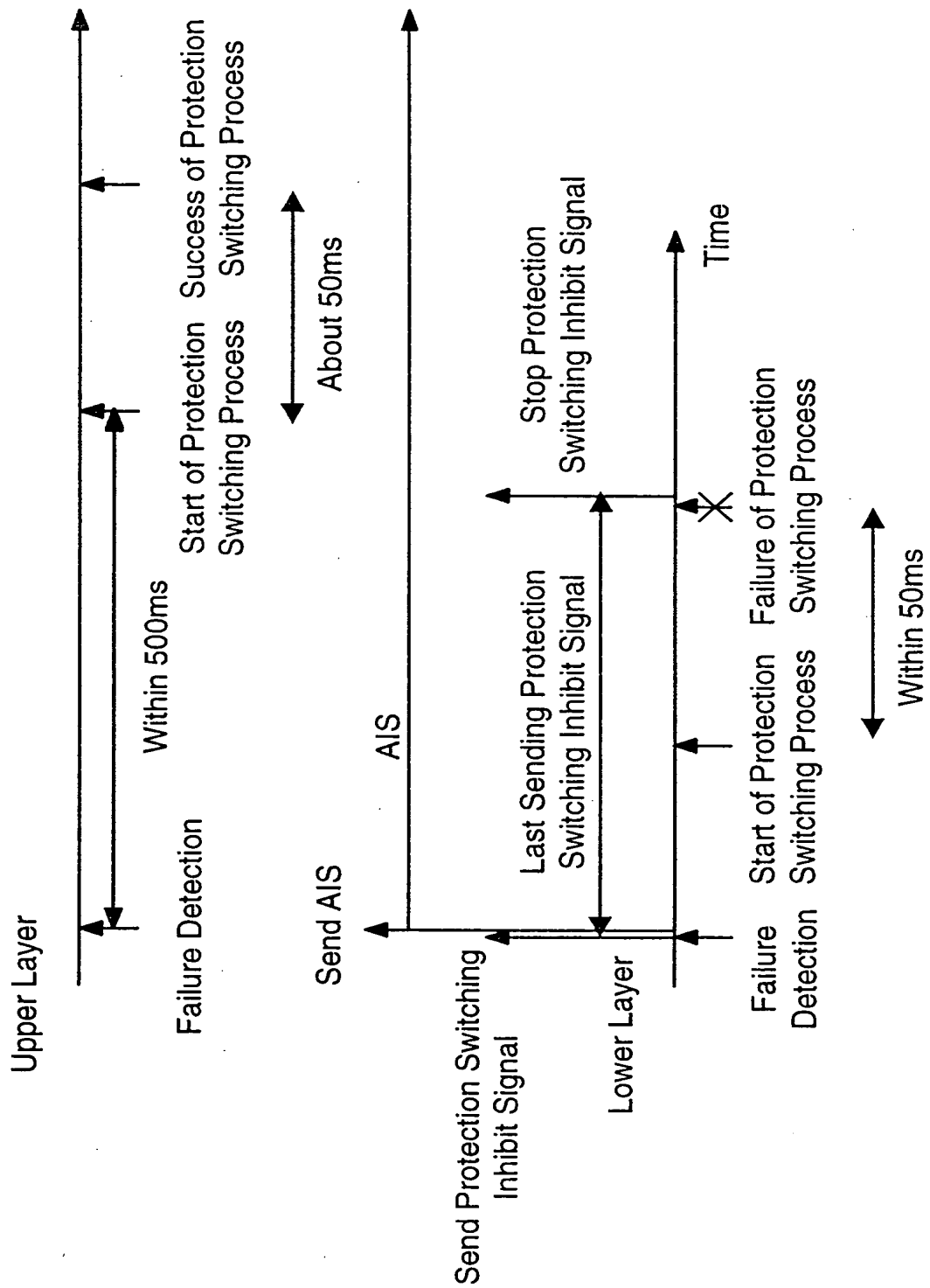


Figure 17

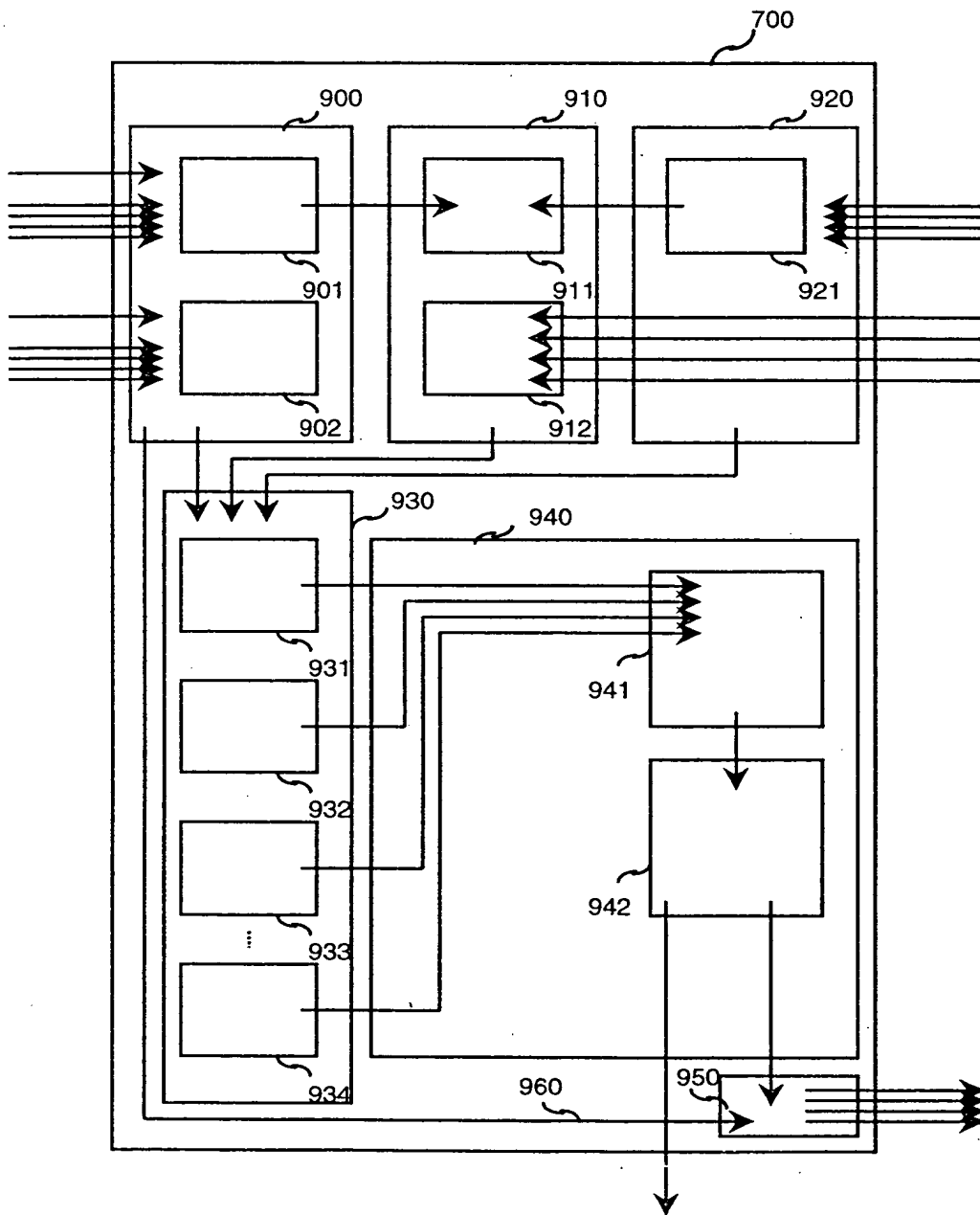


Figure 18

Cooperation Protection Switch Decision Part

Collect Failure Information in Lower Layer Part

Communication Line(W) in Lower Layer Failure Information Table

No.	W
1	1
2	1
3	1
4	0

Communication Line(P) in Lower Layer Failure Information Table

No.	P
1	0
2	0
3	0
4	1

0: Normal
1: Failure

Compare Failure Information in Lower /Upper Layer Part

Available Communication Line(W) Information Table

No.	Available Line (W)
1	0
2	0
3	0
4	0

Available Communication Line(P) Information Table

No.	Available Line (P)
1	0
2	1
3	0
4	0

0: Available
1: Unavailable

Communication Line(W) in Upper Layer Failure Information Table

No.	W
1	1
2	1
3	1
4	0

0: Normal
1: Failure

State Simulation Part

State Simulation Table 1

No.	Case1
1	1
2	1
3	1
4	0

State Simulation Table2

No.	Case2
1	0
2	1
3	0
4	0

State Simulation Table3

No.	Case3
1	0
2	0
3	0
4	1

State Simulation Table4

No.	Case4
1	0
2	0
3	0
4	0

State Selection Part

State Simulation Result1

W / W	
Number of Available Lines	1
Number of Protection Sw.	0

State Simulation Result2

W / W+P	
Number of Available Lines	3
Number of Protection Sw.	3

State Simulation Result3

P / W	
Number of Available Lines	3
Number of Protection Sw.	1

State Simulation Result4

P / W+P	
Number of Available Lines	4
Number of Protection Sw.	2

Decision of the State with the Maximum Number of Available Communication Lines Part

State Simulation Result4

Decision of the State with the Minimum Number of Switch Part

State Simulation Result4

Figure 19

Cooperation Protection Switch Decision Part

Collect Failure Information in Lower Layer Part

Communication Line(W) in Lower Layer

No.	W
1	0
2	0
3	1
4	0

Communication Line(P) in Lower Layer

No.	P
1	0
2	0
3	0
4	1

0: Normal
1: Failure

Compare Failure Information in Lower /Upper Layer Part

Available Communication Line(W) Information Table

No.	Available Line (W)
1	1
2	0
3	0
4	0

Available Communication Line(P) Information Table

No.	Available Line (P)
1	0
2	0
3	0
4	0

0: Available
1: Unavailable

Communication Line(W) in Upper Layer

No.	W
1	1
2	0
3	1
4	0

0: Normal
1: Failure

State Simulation Part

State Simulation Table 1

No.	Case1
1	1
2	0
3	1
4	0

State Simulation Table 2

No.	Case2
1	0
2	0
3	0
4	0

State Simulation Table 3

No.	Case3
1	1
2	0
3	0
4	1

State Simulation Table 4

No.	Case4
1	0
2	0
3	0
4	0

State Selection Part

State Simulation Result 1

W / W	
Number of Available Lines	2
Number of Protection Sw.	0

State Simulation Result 2

W / W+P	
Number of Available Lines	4
Number of Protection Sw.	1

State Simulation Result 3

P / W	
Number of Available Lines	2
Number of Protection Sw.	1

State Simulation Result 4

P / W+P	
Number of Available Lines	4
Number of Protection Sw.	2

Decision of the State with the Maximum Number of Available Communication Lines Part

State Simulation Result 2
State Simulation Result 4

Decision of the State with the Minimum Number of Switch Part

State Simulation Result 2

Figure 20

Cooperation Protection Switch Decision Part

Collect Failure Information in Lower Layer Part

Communication Line(W) in Lower Layer

Failure Information Table

No.	W
1	1
2	0
3	1
4	0

Communication Line(P) in Lower Layer

Failure Information Table

No.	P
1	0
2	0
3	0
4	1

0: Normal
1: Failure

Compare Failure Information in Lower /Upper Layer Part

Available Communication Line(W) Information Table

No.	Available Line (W)
1	0
2	1
3	0
4	0

Available Communication Line(P) Information Table

No.	Available Line (P)
1	0
2	0
3	0
4	0

0: Available
1: Unavailable

Communication Line(W) in Upper Layer

Failure Information Table

No.	W
1	1
2	1
3	1
4	0

0: Normal
1: Failure

State Simulation Part

State Simulation Table1

No.	Case1
1	1
2	1
3	1
4	0

State Simulation Table2

No.	Case2
1	0
2	0
3	0
4	0

State Simulation Table3

No.	Case3
1	0
2	1
3	0
4	1

State Simulation Table4

No.	Case4
1	0
2	0
3	0
4	0

State Selection Part

State Simulation Result1

W / W	
Number of Available Lines	1
Number of Protection Sw.	0

State Simulation Result2

W / W+P	
Number of Available Lines	4
Number of Protection Sw.	2

State Simulation Result3

P / W	
Number of Available Lines	2
Number of Protection Sw.	1

State Simulation Result4

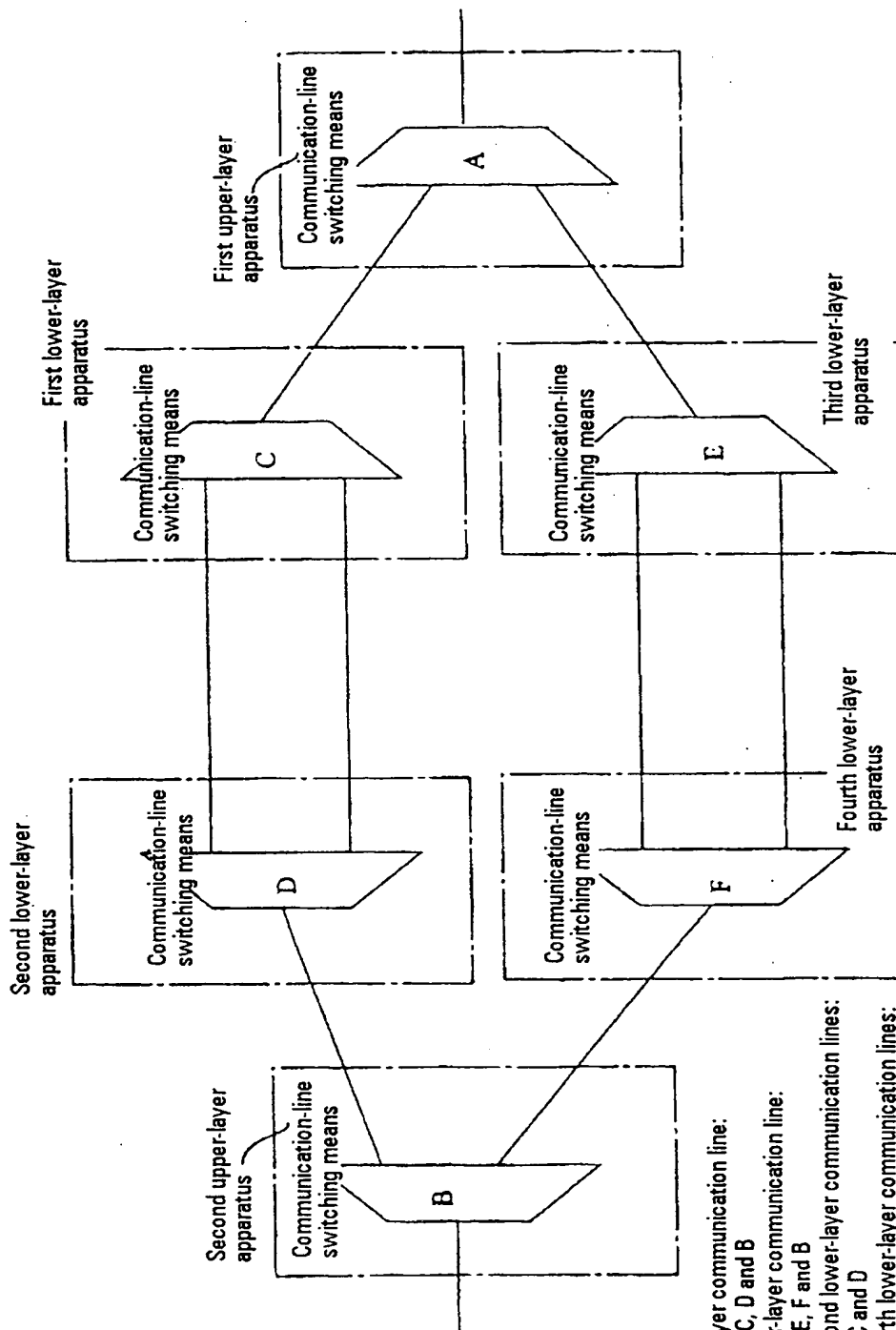
P / W+P	
Number of Available Lines	4
Number of Protection Sw.	2

Decision of the State with the Maximum Number of Available Communication Lines Part

State Simulation Result2
State Simulation Result4

Decision of the State with the Minimum Number of Switch Part

State Simulation Result2
State Simulation Result4



First upper-layer communication line:
among A, C, D and B

Second upper-layer communication line:
among A, E, F and B

First and second lower-layer communication lines:
between C and D

Third and fourth lower-layer communication lines:
between E and F

FIG. 21